	Ft.	In.
Centre of bogie to centre of driving wheels	5	4
„ driving „ coupled . „	6	0
„ coupled „ trailing „	6	0
	17	4

The weights of a sister engine are, as nearly as I could arrive at them, as follows; but the Great Eastern weigh-table is not in good order, nor will it weigh each of a pair of wheels separately:—

	Tons.	Cwt.
Weight on bogie wheels - -	8	18
„ driving „ - -	11	0
„ coupled „ - -	8	14
„ trailing „ - -	10	4
	38	16

These weights were taken with the engine about half full of coal and water, and the full weight may be taken as 40 tons, more or less, with probably about 11 tons on the trailing wheels.

The tanks of these engines are below the foot-plate, and in consequence of this and of their length of wheel base they are as steady as tank engines can well be. In the case of the engine drawing the train to which the accident occurred, it was running with its tank or trailing wheels first, and in consequence of the weight on these being greater than that on the leading (or bogie) wheels there would be less tendency to mount than had it been running the other way.

The damage to the engine was considerable, all the lighter parts being more or less injured or destroyed. Four springs (of the two driving wheels, one coupled wheel, and one bogie wheel) were broken, the plates, so far as I could see, showing signs of recent fracture, and being probably consequences of the accident. None of the axles appear to have been bent, nor the wheels to have shifted on the bearings. The gauge of each pair was fairly true, if anything rather *tight*.

As before remarked, the *immediate* cause of this accident was in all probability the fracture of the joint chair; and I have now further to remark that I believe this fracture to have been principally due to the strength of the chairs being insufficient for the heavy class of engines which have been running on the line for the last three years. The occurrence of this fracture was very possibly hastened by tightness of gauge; from more violent action in the chair, owing to the introduction of the short rail; and from the presence of a chip on its outer lip.

There is, I think, but little reason to doubt that more chairs will be broken and fresh accidents result, if the same class of engines, as at present, is continued to work the line until the joints are fish-plated and heavier chairs introduced; and to this remark I would desire to call the especial attention of the directors. It seems also desirable that the two short closing rails should be at once removed, and this portion of the line relaid with six or eight slightly shortened rails.

In conclusion I regret to have to state that, in the details furnished to the Board of Trade prior to the opening of the line in October 1848, the weight of the joint chairs is stated to have been 32 lbs., and of the intermediate chairs 21 lbs. each, the actual weights being now only 22½ lbs. and 20 lbs. respectively, there having been no alteration in the chairs from that time to this. The appearance of the joint chairs is such as to induce belief in the greater weight, the surface of the chair being large, and until I saw the broken chair weighed I was under the impression that Mr. Davis, the engineer of the line, must have understated the weight in returning it as only 22½ lbs. I have little doubt therefore that the inspecting officer who passed the line was misled by the apparent size of the joint chairs, and had no suspicion that their weight was so considerably less than that returned by the then engineer. The sins of the company have certainly in this case found them out. Far better for them would it have been to have had the opening of the line temporarily postponed for the substitution of heavier joint chairs for those presented to the inspecting officer as being 10 lbs. heavier than they really were. The blame and expense of this unhappy accident would then in all probability have been avoided.

I have, &c.,
C. S. HUTCHINSON,
Lieut.-Col., R.E.

The Secretary,
Railway Department,
Board of Trade.

A copy of the above report sent to company on the 30th July.

LANCASHIRE AND YORKSHIRE RAILWAY.

Board of Trade
(Railway Department),
Whitehall, 3rd July 1869.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in obedience to your minute of the 1st ult., the result of my inquiry into the circumstances which attended a collision that occurred betwen a passenger and a goods train near the Salford station of the Lancashire and Yorkshire Railway on the 28th May, when about six passengers are stated to have been slightly injured.

There are signal boxes at each end of the Salford station, with telegraphic communication between them, and the signal box at the eastern end of the station also communicates with the signal box at the west end of the Victoria station. Telegraphic bells and gongs are rung from these boxes to give notice to the signal box in advance that a train is approaching.

The signal box at the eastern side of the Salford station is furnished with a down distant and down semaphore signal; the distant signal being about 390 yards from the semaphore signal.

It appears that on the day in question a train from Bury for Victoria station, Manchester, passed the signal box at the eastern end of the Salford station at 11h. 10m. a.m., and it returned empty from Manchester about 11h. 18m., to be shunted to the other line at the western end of the Salford station, in accordance with the usual practice followed in working the traffic, rendered necessary by the insufficient amount of accommodation provided at the Victoria station for the Lancashire and Yorkshire Railway Company's trains.

It was followed from Manchester by a goods train, running out of its proper time, which passed the signal box before referred to at 11h. 23m., which train was stopped with the break van a few yards inside the semaphore signal, in consequence of the Bury train of empty carriages not having yet been got out of the way on the down line.

The goods train had been stopped about one minute when the telegraphic bell from Victoria station was rung to give notice that the 11h. 20m. a.m. Liverpool and Blackburn passenger train was on its way to Salford, and the signalman at the eastern end of the

Salford station kept both his distant and semaphore signals on at danger, and he held a red flag out of the window, in order to stop the train.

The passenger train consisted of an engine and tender and ten vehicles, of which three carriages and a break van with a guard in it were for Liverpool, and five carriages and a break van at the tail of the train, with another guard in it, were for Blackburn.

Salford is not so much as three quarters of a mile from the Victoria station ; and the driver of this train, when he found the distant and semaphore signals worked from the box at the eastern end of Salford station on at danger, thought they were on only to cover the shunting of the train of empty carriages at the west end of the Salford station, and expected that he could run into the station, and set down and take up passengers, his train being appointed to stop at Salford, as he was not aware that a goods train had followed instead of having preceded, as it should have done, the train of empty carriages. But when he was within 40 or 50 yards of the goods van at the tail of the train, he observed that the line was obstructed, and he says he shut off the steam, reversed his engine, and whistled for the guard's breaks, but was unable to stop before the engine had come into collision with the goods break van, and had knocked it off the road, and the leading and driving wheels of his engine were also thrown off the rails. He estimates the speed at which he was running at the time at four or five miles an hour. The head guard names eight, but the actual speed was probably more than either estimate, as the bodies of the whole of the carriages were shifted on the frames, and the buffer plank of the engine and one buffer were broken, and some of the axles were said to be strained.

The passenger train left Victoria station at 11h. 22m. a.m., two minutes late, and the collision occurred at 11h. 25m. The train was fitted throughout with continuous breaks, and the head guard says that his break was applied before the driver whistled for the breaks, in order to stop at the station. The whistle, he says, was not sounded half a minute before the collision occurred. This guard had four vehicles fitted with continuous breaks under his control.

The first notice which the second guard at the tail of the train had of anything being wrong was his being thrown down in his van by the shock of the collision, as he heard no whistle for the breaks, although it appears certain one was given.

The collision was caused by the driver of the passenger train disregarding the danger signals exhibited on the distant and semaphore signals until it was too late to stop his train before the collision took place, but he did the same thing that day as he was in the habit of doing on most days without a mishap.

For this collision he was suspended from duty for three weeks ; but for what occurs on most days, the offence being the same, he is not even reported, although it is well known that such is the practice.

The collision could not have occurred if the traffic had been worked with the assistance of the electric telegraph on the absolute block system, thus preserving an interval of space between two following trains.

The goods train was permitted to leave Victoria station three minutes before the passenger train was appointed to start, in direct defiance of the company's regulations, it being late that morning, the proper time of leaving being at 11h. 10m., or before the train of empty carriages, and the reason for sending it forward was that it was keeping two trains that were standing behind it from entering Victoria station from the east.

I have, &c.
W. YOLLAND,
Colonel.

The Secretary
(Railway Department),
Board of Trade.

A copy was sent to the Company on the 24th July 1869.

LONDON AND NORTH-WESTERN RAILWAY.

SIR, 1, *Whitehall, S.W., 30th June,* 1869.

IN compliance with the instructions contained in your minute of the 17th instant, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances attending a collision which occurred on the 12th inst. between an engine and a passenger train at St. Helens station on the London and North-Western Railway.

One passenger is returned as having been slightly shaken by the collision, and the driver of the passenger train had his hand injured.

St. Helens is a station to which numerous local trains run from St. Helens junction and back ; it is also a through-station for trains from Widnes to Rainford junction. The station is one-sided, having only one platform on the up or west side, and the practice is for local trains to draw up at the south end of the platform (that nearest St. Helens junction), while up through trains are turned through a pair of points to the south of the station on to a loop, which rejoins the main up line at about the centre of the platform, the northern end of which is reserved for through-trains. To enable the engine of a local train to run round its train, it backs through the points which admit a through-train to the platform, and through a cross-over road in connection with these points between the up and down lines, runs along the down line for some distance (crossing an opening canal bridge at which a signalman is stationed) to another cross-over road a short distance south of the bridge signalman's hut, and then, if not stopped by signal from this man, returns by the cross-over road (the down-line points of which are weighted to lie right for the crossing) to the up line, and so back to the south end of its train. The signalman at the canal bridge is provided with up and down main and distant signals, but on account of curves and buildings, and the lowness of the signal post, he is unable to see his up distant signal. In addition to the charge of these signals for the protection of the opening bridge, this signalman has also to hold the facing points by which the up trains from Widnes enter the loop before alluded to, and also the up line points of the cross-over road to the south of his box, when they become facing points for the local down trains from St. Helens to the junction, as these trains run from the platform as far as this cross-over road on the up or wrong line.

On the 12th instant the 12.45 p.m. local train had left St. Helens junction for St. Helens a minute or two late. It was drawn by a tank engine, running tank in front, driven by a very experienced driver, who had been locomotive foreman on the St. Helens line when it had been an independent undertaking. The train arrived at St. Helens at 12.59, one minute late ; the engine was immediately unhooked, backed on to the down line, and ran on it as far as the cross-over road to the south of the opening bridge, the down bridge signal having been lowered as the engine approached it. Before starting again to run through the cross-over road to the up line, and so rejoin its train, the driver states that he got no signal from the bridge signalman to hold on, but that when he had got some 12 ft. through the points (which as before stated are weighted to lie right for the down end of the cross-over road,) he saw this man hold out both his arms as a signal for him to stop, and not foul